



Enabler Validation Plan for Charging 1.0

Candidate Version 1.0 – 08 May 2007

Open Mobile Alliance
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1. Scope

This document details the Validation plan for the Charging 1.0 Enabler Release. The successful accomplishment of the validation activities will be required for the Enabler to be considered for Approved status.

The validation plan for the Charging 1.0 Enabler Release specifications is based on expected testing expectations in the Enabler Test Requirements (ETR).

2. References

2.1 Normative References

- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.4, Open Mobile Alliance™, OMA-ORG-IOP_Process-V1_4, URL:<http://www.openmobilealliance.org/>
- [IOPTFG] “OMA TestFest Participation Guidelines”, Version 1.0, Open Mobile Alliance™, OMA-IOP-TestFest-Participation-Guidelines-V1_0, URL:<http://www.openmobilealliance.org/>
- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL:<http://www.ietf.org/rfc/rfc2119.txt>
- [IOPTTESTMINUTES 2006] “Summary: Diameter Interop 2006”, Victor Fajardo , April 2006, URL:<http://www.tschofenig.com/dime-interop-2006/meeting-minutes.txt>
- [IOPTTESTMINUTES 2007] “Diameter Interop 2007 Meeting Minutes”, Victor Fajardo, February 2007, <http://www.tschofenig.com/twiki/bin/view/Dime/DiameterInterop2007>
- [IOPTTESTSUITE] “Diameter Interoperability Test Suite” (IETF Draft: draft-fajardo-dime-interop-test-suite-03.txt), V. Fajardo, A. McNamee, H. Tschofenig, J. Bournelle URL:<http://tools.ietf.org/wg/dime/>

2.2 Informative References

- [OMADICT] “Dictionary for OMA Specifications”, Version 2.5, Open Mobile Alliance™, OMA-ORG-Dictionary-V2_5, URL:<http://www.openmobilealliance.org/>
- [3GPP TS 32.299] “Telecommunication management; Charging management; Diameter Charging Applications”, 3GPP Technical Specification TS32.299 Rel-6, URL: <http://www.3gpp.org>
- [ERELED] “Enabler Release Definition for Charging Enabler”, Open Mobile Alliance™, OMA-ERELED-Charging-V1_0, URL: <http://www.openmobilealliance.org/>
- [IOPPROC] “OMA Interoperability Policy and Process”, Version 1.3, Open Mobile Alliance™, OMA-ORG-IOP_Process-V1_3, URL: <http://www.openmobilealliance.org/>
- [RFC2119] “Key words for use in RFCs to Indicate Requirement Levels”, S. Bradner, March 1997, URL: <http://www.ietf.org/rfc/rfc2119.txt>
- [RFC3588] “Diameter Base Protocol”, P. Calhoun, J. Loughney, E. Guttman, G. Zorn, J. Arkko. September 2003, URL: <http://www.ietf.org/rfc/rfc3588.txt>
- [RFC4006] “Diameter Credit-Control Application”, H. Hakala, L. Mattila, J-P. Koskinen, M. Stura, J. Loughney. August 2005, URL: <http://www.ietf.org/rfc/rfc4006.txt>
- [CHRG_ONLINE] “OMA Online Charging Interface”, Version 1.0, OMA-TS- Charging_Online-V1_0, Open Mobile Alliance™. URL: <http://www.openmobilealliance.org/>

3. Terminology and Conventions

3.1 Conventions

The key words “MUST”, “MUST NOT”, “REQUIRED”, “SHALL”, “SHALL NOT”, “SHOULD”, “SHOULD NOT”, “RECOMMENDED”, “MAY”, and “OPTIONAL” in this document are to be interpreted as described in [RFC2119].

All sections and appendixes, except “Scope”, are normative, unless they are explicitly indicated to be informative.

3.2 Definitions

none

3.3 Abbreviations

OMA	Open Mobile Alliance
IETF	Internet Engineering Task Force
ETS	Enabler Test Specification
ETR	Enabler Test Requirements
AVP	Attribute-Value Pair
CH-1	OMA Offline Charging Interface
CH-2	OMA Online Charging Interface

4. Charging Enabler Validation Description

The Charging Enabler provides two interfaces for other enablers, application or resources to send charging information. The supported charging methods are online and offline charging. The charging interfaces are intended to be independent of the underlying charging infrastructure and extensible so that as many enablers and charging infrastructures can be supported as possible without the need to change the basic behaviour of the charging interfaces.

The interfaces of the Charging Enabler are based on the Diameter protocol suite defined in IETF [RFC3588, RFC4006]. The offline interface CH-1 is based on the Diameter Accounting Application defined in [RFC3588], and the online interface CH-2 is based on the Diameter Credit Control Application defined in [RFC4006]. In addition, some protocol extensions defined in [3GPP TS 32.299] are re-used. The OMA specific information or extensions to Diameter is the content of the service-information related AVPs only.

Test cases for the Diameter base protocol, Diameter Accounting Application and Diameter Credit Control Application have been defined in the IETF and tested during the Diameter interop events [IOPTTESTMINUTES2006] on April 24-28, 2006, and [IOPTTESTMINUTES2007] on January 29th to February 2nd, 2007. During the 2007 interop event, 14 independent implementations of the Diameter Base Protocol and 11 implementations of the Credit Control Application took part in the interoperability testing and execution of all test cases required for covering ETRs set for the Charging Enabler resulted in Successful Testing status.

Because the test cases executed during IETF interop events cover the entire set of Enabler Test Requirements set for OMA's Charging Enabler, no further conformance or interoperability testing of the Charging Enabler is needed within OMA.

The following sections describe more in detail which IETF test cases cover the Enabler Test Requirements for the OMA Charging Enabler.

4.1 Online Charging

4.1.1 Immediate Event Charging

Related ETRs:

- Required to test whether event charging messages are utilized properly in Online Charging

IETF test cases needed to cover:

- All cases listed in [IOPTTESTSUITE] subsections
 - o 4.1.1.1
 - o 4.1.1.2
 - o 4.1.1.3

4.1.1.1 Direct Debit Operation

Related mandatory ETRs:

- Direct Debit Operation:
 - o Decentralized Unit Determination and Centralized Rating
 - o Centralized Unit Determination and Centralized Rating
 - o Decentralized Unit Determination and Decentralized Rating

Covered by IETF test cases:

- [IOPTTESTSUITE] section 4.2.1.8.

4.1.1.2 Balance Check Operation

Related optional ETRs:

- Balance Check Operation
 - o Event Charging with Balance Check

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.2.1.7

4.1.1.3 Price Enquiry

Related optional ETR:

- Price Enquiry Operation

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.2.1.6

4.1.1.4 Refund Operation

Related optional ETRs:

- Refund Operation:
 - o Decentralized Rating
 - o Centralized Rating
 - o Reserve Units Operation
 - o Decentralized Unit Determination and Centralized Rating
 - o Centralized Unit Determination and Centralized Rating
 - o Decentralized Unit Determination and Decentralized Rating

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.2.1.9

4.1.2 Session Based Charging

Related ETRs:

- Required to test whether session based charging messages (start, interim, stop) are utilized properly
- Required to test whether reservation operation is utilized properly.
- Required to test whether reservation operation is utilized properly.

IETF test cases needed to cover:

- All cases listed in [IOPTTESTSUITE] subsections
 - o 4.1.2.1
 - o 4.1.2.2
 - o 4.1.2.3

4.1.2.1 Initial Request and Response

Related mandatory ETRs:

- Reserve Units Operation
 - o Decentralized Unit Determination and Centralized Rating
 - o Centralized Unit Determination and Centralized Rating
 - o Decentralized Unit Determination and Decentralized Rating

Covered by IETF test cases:

- [IOPESTSUITE] section IETF 4.2.1.1.
- [IOPESTSUITE] section IETF 4.2.1.4 If implementation supports Multiple-Services-Credit-Control AVP and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.1: If implementation supports Tariff-Change-Usage and Tariff-Time-Change AVPs and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.2 If implementation supports Final-Unit-Indication and Final-Unit-Action AVPs and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.3 If implementation supports Validity-Time AVP and associated functionality

4.1.2.2 Update Request and Response

Related mandatory ETRs:

- Reserve Units and Debit Units Operation:
 - o Decentralized Unit Determination and Centralized Rating
 - o Centralized Unit Determination and Centralized Rating
 - o Decentralized Unit Determination and Decentralized Rating

Covered by IETF test cases:

- [IOPESTSUITE] section IETF 4.2.1.2.
- [IOPESTSUITE] section IETF 4.2.1.4 If implementation supports Multiple-Services-Credit-Control AVP and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.1: If implementation supports Tariff-Change-Usage and Tariff-Time-Change AVPs and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.2 If implementation supports Final-Unit-Indication and Final-Unit-Action AVPs and associated functionality
- [IOPESTSUITE] section IETF 4.2.2.3 If implementation supports Validity-Time AVP and associated functionality

4.1.2.3 Termination Request and Response

Related mandatory ETRs:

- Debit Units Operation:
 - o Centralized Rating
 - o Decentralized Rating

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.2.1.3.
- [IOPTTESTSUITE] section IETF 4.2.1.4 If implementation supports Multiple-Services-Credit-Control AVP and associated functionality
- [IOPTTESTSUITE] section IETF 4.2.2.1: If implementation supports Tariff-Change-Usage and Tariff-Time-Change AVPs and associated functionality
- [IOPTTESTSUITE] section IETF 4.2.2.2 If implementation supports Final-Unit-Indication and Final-Unit-Action AVPs and associated functionality

4.1.3 Error Handling

Related mandatory ETR:

- Error Flow

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.2.1.5.
- [IOPTTESTSUITE] section IETF 4.2.2.10.

4.2 Offline Charging

4.2.1 Event Based Charging

Related mandatory ETR:

- Offline Event based Charging: Offline (Simple)

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.1.1.2. except for Real-Time-Required and Sub-Session AVPs and associated functionality

4.2.2 Offline Session based Charging: Offline (Session)

Related mandatory ETR:

- Offline Session based Charging: Offline (Session)

Covered by IETF test cases:

- [IOPTTESTSUITE] section IETF 4.1.1.2. except for Real-Time-Required and Sub-Session AVPs and associated functionality

4.2.3 Error Handling

Related mandatory ETR:

- Error Flow

Covered by IETF test cases:

- [IOPTESTSUITE] section IETF 4.1.1.2 negative test cases.

5. Validation Activities for Enabler Specific Extensions

Interoperability testing of the enabler specific extensions to the Charging Enabler framework is deemed not necessary as the extensions are primarily service specific information rendered by the Charging Enabler User to the Charging Enabler implementation's rating function for the purposes of rating the usage request and thus do not affect the behaviour of the Charging Enabler framework itself (i.e. behaviour related to the interfaces and protocols within the scope of Charging Enabler specifications).

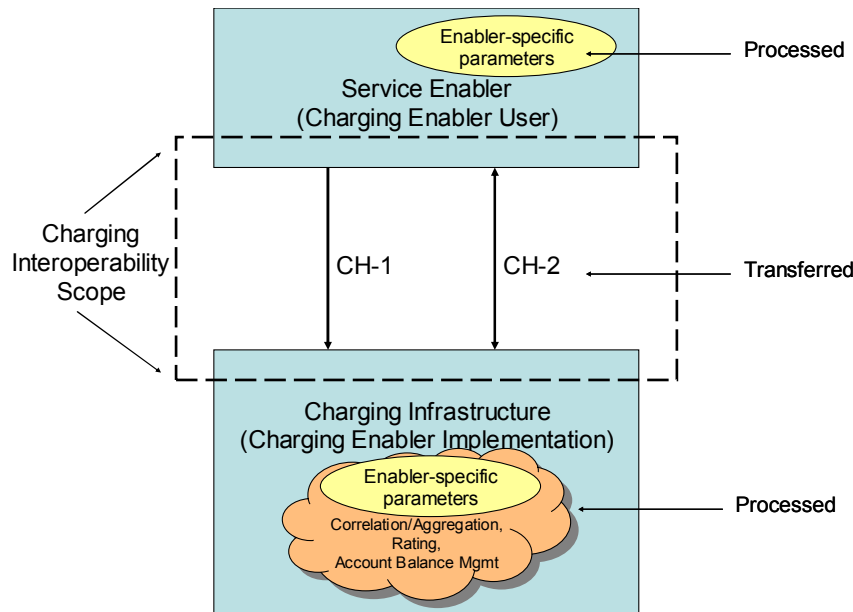


Figure 1 Role of Enabler-Specific Rating Parameters

It is considered that for charging interoperability purposes it adds no value to test whether the individual enabler-specific rating parameters are correctly processed by the Charging Infrastructure because although the parameters affect the decision-making process (i.e. rating) their effect on the outcome is not necessarily directly visible on the responses from the Charging Infrastructure. What is deemed, however, to potentially add value to interoperability testing, is to verify that the Service Enablers using the online charging mechanism of the OMA Charging Enabler and have sufficiently specified their own behaviour (i.e. effects to their flows) in different cases when there is a positive, negative or no response at all from the Charging Infrastructure. The purpose of this interoperability testing would be to verify the integration between the Service Enablers and the OMA Charging Enabler rather than to verify the correct handling of the service-specific rating parameters.

It is proposed that OMA develops a test tool that simulates a Charging Infrastructure and helps the Service Enablers to verify their behaviour in online charging interactions with the OMA Charging Enabler. The high-level requirements for this test tool should cover at least the following:

- The test tools MUST implement the Diameter Credit Control Application server functionality as specified in [RFC4006] and [CHRG_ONLINE]
- It MUST be possible to configure the test tool to give appropriate responses to different charging requests so that the positive and negative test cases specified in the following sections of [IOPTESTSUITE] can be executed:
 - 4.2.1.1 Session-based credit control first interrogation
 - 4.2.1.2 Session-based credit control intermediate interrogation
 - 4.2.1.3 Session-based credit control final interrogation
 - 4.2.1.5 Session-based credit control failure procedures

- 4.2.1.6 Service price enquiry
- 4.2.1.7 Balance Check
- 4.2.1.8 Direct Debiting
- 4.2.1.9 Refunds
- 4.2.1.10 Event-based credit control failure procedures

6. Approval Criteria

It is deemed that no further testing within OMA is needed to validate Charging 1.0 Enabler Release.

Appendix A. Change History (Informative)

A.1 Approved Version History

Reference	Date	Description
n/a	n/a	No prior version –or- No previous version within OMA

A.2 Draft/Candidate Version 1.0 History

Document Identifier	Date	Sections	Description
Draft Versions OMA-EVP-Charging-V1_0	08 Feb 2007	All	First revision using the EVP template based on discussions in MCC-IOPPRC joint meeting in San Francisco on Feb 6, 2007
	06 Mar 2007	2.1, 4	Added references to IOP Diameter interop event 2007 and test results
	05 Apr 2007	n/a	IOP WG agreed
Candidate Version OMA-EVP-Charging-V1_0	08 May 2007	n/a	Status changed to Candidate, TP R&A From 25 Apr to 08 May 2007 TP# OMA-TP-2007-0168R01- INP_EVP_Charging_V1_0_for_Candidate_Approval